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APR -5 2001

IN THE UNITED STATES MAIL ROOM.  
PATENT AND TRADEMARK OFFICE

#15/Key 2823  
Recon.  
PATENT  
A. Paul  
4/7/01

In re application of:

Sailesh Merchant, *et. al.*

Serial No.: 09/092,158

Filed: June 6, 1998

For: METHOD FOR THE FABRICATION OF CONTACTS IN AN  
INTEGRATED CIRCUIT DEVICE

Grp./A.U.: 2823

Examiner: Eaton, K.

Honorable Commissioner of Patents  
Washington, D.C. 20231

I hereby certify that this correspondence is being deposited with the United States Postal Service  
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Glenda L. Willis  
(Signature of the person signing the certificate)

Sir:

**REQUEST FOR RECONSIDERATION UNDER 37 C.F.R. § 1.111**

In response to the Examiner's Action mailed January 31, 2001, please reconsider the  
above-identified application in view of the following remarks.

**REMARKS/ARGUMENTS**

The Applicants have carefully considered this application in connection with the  
Examiner's Action and respectfully request reconsideration of this application. No claims have  
presently been amended nor have claims been canceled. Accordingly, Claims 1, 2, 4-12 and 14-24  
are currently pending in the application.

**I. Rejection of Claims 1, 2, 4-12 and 14-24 under 35 U.S.C. §103**

The Examiner has rejected Claims 1, 2, 4-12 and 14-24 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,604,156 to Chung, *et. al.* (Chung) in view of U.S. Patent 5,731,225 to Yamamori (Yamamori). Chung is directed to a method of forming multiple wiring layers that avoids the formation of protrusions on the sidewalls of the contact holes. Chung teaches that the removal of the buried main group oxide or nitride first capping layer and the barrier layer from the region to be etched in the formation of the contact hole eliminates such protrusions. The Examiner has stated that Chung fails to teach, among other things, subjecting the contact plug to a temperature sufficient to anneal the barrier layer. To cure this deficiency the Examiner relies on Yamamori.

Yamamori is directed to the removal of fluorine impurities that adhere to barrier surfaces during etching processes. Yamamori teaches that heating under reduced pressures can remove the fluorine. The Examiner asserts that heating a contact plug to remove fluorine from a barrier according to Yamamori teaches subjecting the contact plug to a temperature sufficient to anneal the barrier layer.

The Applicants respectfully assert that Yamamori contains no such teaching. While Yamamori teaches that heating to a temperature of 220°C or higher may remove the fluorine from the barrier surface, nothing in this reference suggests a temperature sufficient to anneal the barrier layer. Moreover, one skilled in the art would not be motivated to reach barrier annealing temperatures since such temperatures enhance the reactivity of the barrier layer, thereby promoting the formation of barrier-fluorine compounds. Such a result is antithetical to Yamamori's expressed motivation of removing fluorine from the barrier.

*heating  
anneal  
with  
need  
evidence  
because  
Yamamori*

Claims 1, 12 and 24 each recite that the method subject the contact plug to a temperature sufficient to anneal the barrier layer, such that titanium silicide may be advantageously formed.

Because such annealing would be antithetical to Yamamori's expressed motivation, Yamamori lacks any teaching or suggestion of subjecting the contact plug to an annealing temperature and one skilled in the art would not be motivated to modify Yamamori to arrive at the present invention. Thus, the asserted combination fails to establish a *prima facie* case of obviousness with respect to Claims 1, 12, and 24 and Claims dependent thereon.

Alternatively, the Applicants submit that Yamamori is not a proper art reference for the purposes of establishing a *prima facie* case of obviousness. The Applicants respectfully submit that Yamamori is antedated by the present invention. In support of this assertion, the Applicants submit herewith Exhibit A which includes an Affidavit of Sailesh Merchant, who is a joint inventor of the subject matter of this application. Because the present invention antedates the Yamamori reference, the asserted combination improper, and as the Examiner has stated, Chung fails to establish a *prima facie* case of obviousness with respect to Claims 1, 12, and 24 and Claims dependent thereon.

not good  
is enough

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 1, 2, 4-12 and 14-24 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.



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**Conclusion**

In view of the foregoing amendment and remarks, the Applicants now see all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicit a Notice of Allowance for Claims 1, 2, 4-12 and 14-24.

Respectfully submitted,

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